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Photometric properties of the Local Volume dwarf galaxies

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Abstract

We present surface photometry and metallicity measurements for 104 nearby dwarf galaxies imaged with the Advanced Camera for Surveys and Wide Field and Planetary Camera 2 aboard the Hubble Space Telescope. In addition, we carried out photometry for 26 galaxies of the sample and for Sextans B on images of the Sloan Digital Sky Survey. Our sample comprises dwarf spheroidal, irregular and transition type galaxies located within ~10 Mpc in the field and in nearby groups: M81, Centaurus A, Sculptor and Canes Venatici I cloud. It is found that the early-type galaxies have on average higher metallicity at a given luminosity in comparison to the late-type objects. Dwarf galaxies with M B ≥ -12 to -13 mag deviate towards larger scalelengths from the scalelength- luminosity relation common for spiral galaxies, h ∝ L 0.5 B. The following correlations between fundamental parameters of the galaxies are consistent with expectations if there is pronounced gas loss through galactic winds: (1) between the luminosity of early-type dwarf galaxies and the mean metallicity of constituent red giant branch stars, Z ~ L 0.4, (2) between mean surface brightness within the 25 mag arcsec -2 isophote and the corresponding absolute magnitude in the V and I bands, SB 25 ~ 0.3M 25 and (3) between the central surface brightness (or effective surface brightness) and integrated absolute magnitude of galaxies in the V and I bands, SB 0 ~ 0.5M L, SB e ~ 0.5 M e. The knowledge of basic photometric parameters for a large sample of dwarf galaxies is essential for a better understanding of their evolution. © 2008 RAS.

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Keywords

Galaxies: fundamental parameters, Galaxies: general, Galaxies: photometry, Galaxies: structure